

Portal Hypertension- The possible role of MRI to determine changes in blood flow and HVPG

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The Clinical Need..

A sensitive and non-invasive measure of Liver haemodynamics that infers change in flow-pressure relationships

- Monitoring treatment/dose responses (e.g. BB, Carvedilol)
- Utility in testing intervention with novel therapies in Man

The Challenge.... Can MRI technology be adapted to fulfil this need?

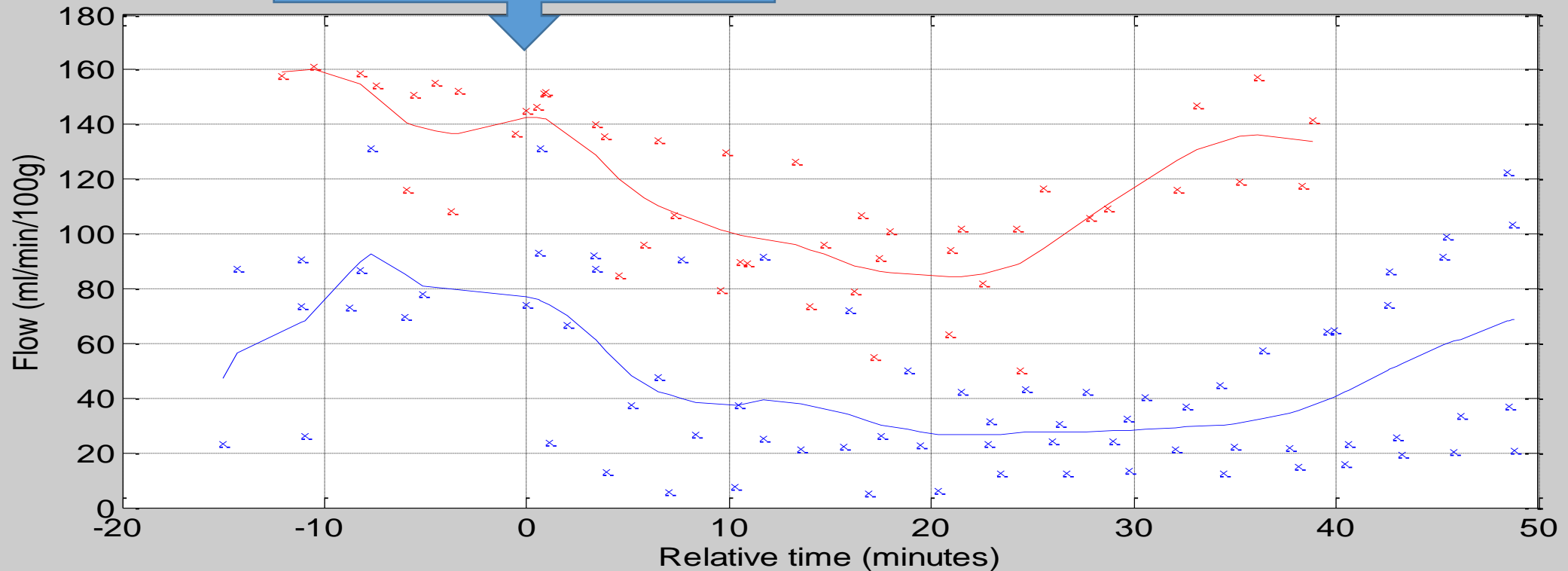
- Informing intensive management of advanced disease

PC-MRI – preliminary rodent data

Reduction in PV flow in sham and cirrhotic BDL animals after terlipressin:

	TTUS (n = 3)	PCMR (n = 3)	P-value
PV flow (ml/100g/min)		138.97±13.67	0.422

terlipressin administered

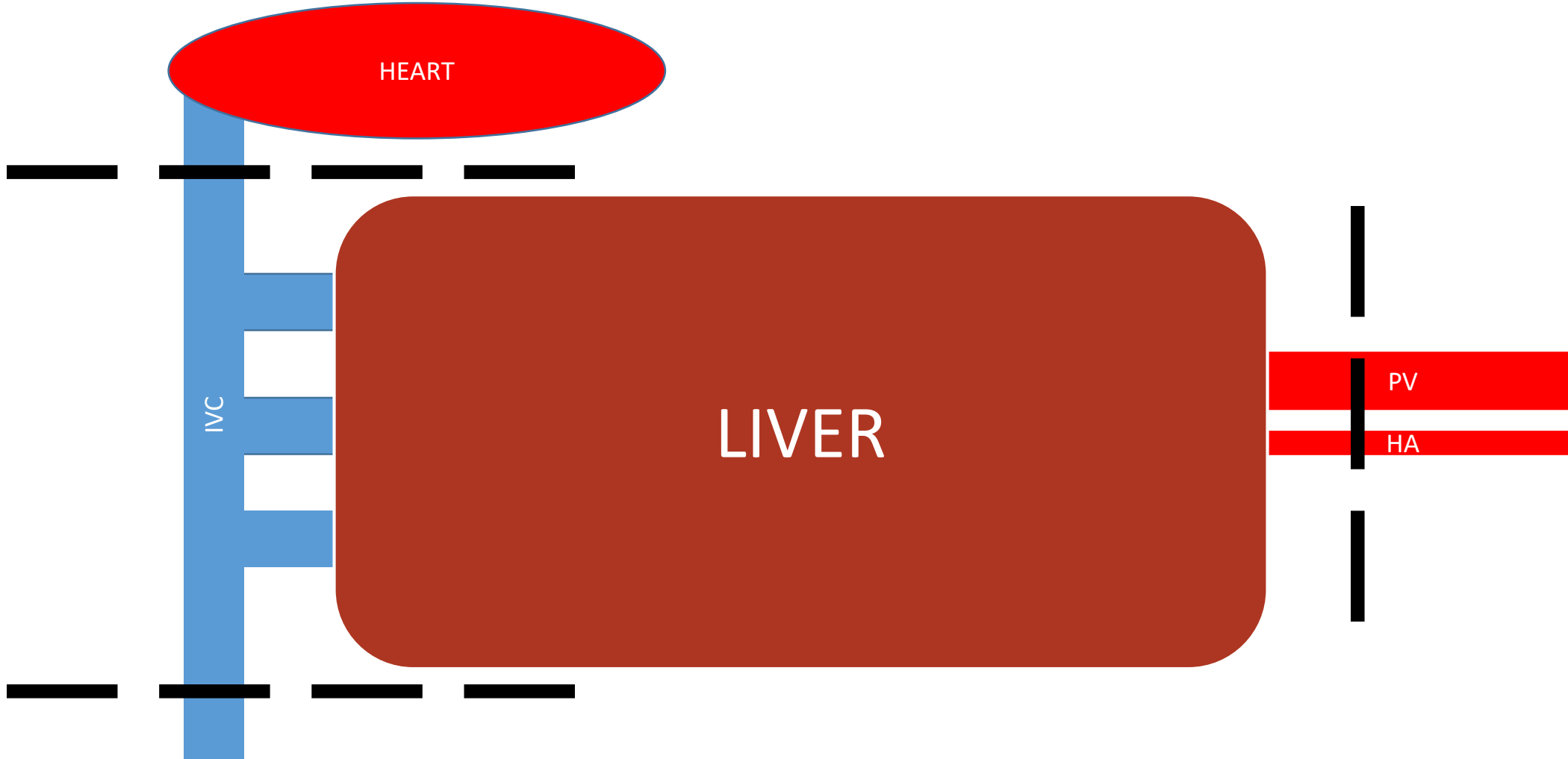


(Adapted from D'Almeida et al. Am J Physiol 1996;271(40):H2701-2709.)

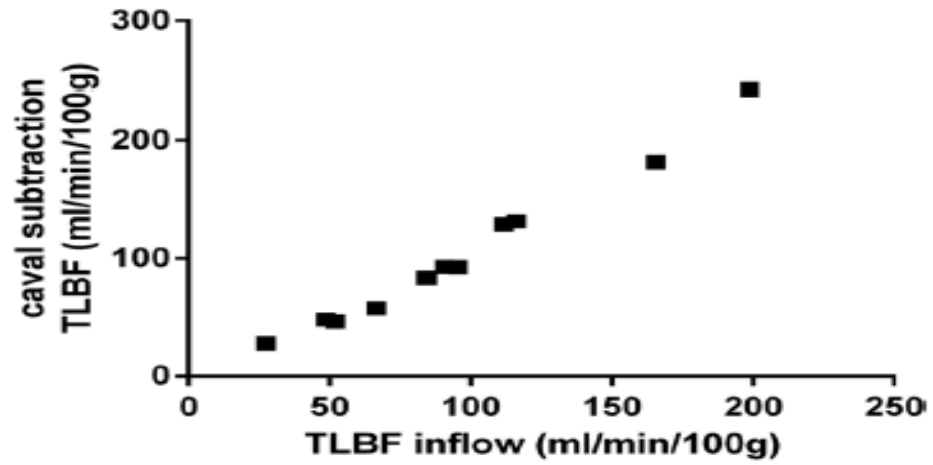
Sham vs. BDL

Phase-contrast MRI – clinical translation

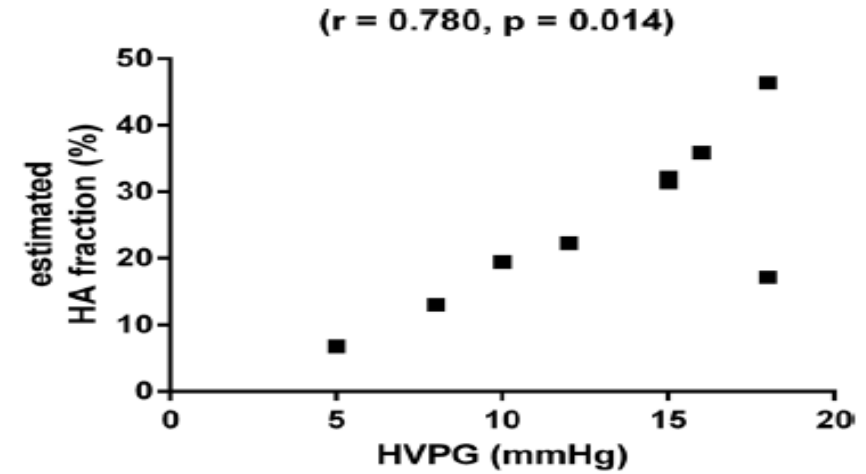
- Difficulty imaging smaller vessels – hepatic artery
- Partial voluming over vessel wall, pulsatility etc.
- So, a subtractational IVC measurement was adopted.....



PC MRI mid way along the PV with simultaneous imaging of the HA



Chouhan et al, Invest Radiol 2017



Data from Cardiac Cine MRI and ASL protocols in cirrhosis rodent models, also being translated to clinical protocols

On-going study at RFH assessing Liver haemodynamics and Cardiac protocol for patients Pre-Post BB: Academy of Med Sci funded

Summary

- Lowering portal pressure is associated with improved outcome but practical translation assessing efficacy of intervention, warrants non-invasive measures
- Assessment of flow is equally important when assessing efficacy of therapies not just portal pressure change in decompensated patients
- Early studies suggest PC MRI and ASL may have value in determining portal flow dynamics
- Harness collective strengths RFH, Nottingham, Edinburgh, and Birmingham to deliver a robust model of liver blood flow/resistance/ cardiac dynamics for early clinical translation
- Acknowledgement: Manil Chouhan, David Patch and Ahmed Amin